infection. Hybrids having one or more resistant parents show in many instances promising resistance. The discussion, representing as it does some forty diseases and pests in the Philippines and nearly an equal number in the Asiatic countries visited, emphasizes the need for intensive studies of plant diseases in the regions where they have been long established.—W. T. SWINGLE.

Stelar morphology.—In his presidential address to the Royal Society of Edinburgh, BOWER[10] emphasizes the importance of the principle of similitude (GALILEO) in the investigation of the stelar morphology of the higher plants. He argues that, inasmuch as the surface of an organ or tissue varies only as the square of its linear dimensions, but the bulk as the cube, the larger a plant is the more dependent it will be upon its form and detailed structure, not only for its stability, but also for the performance of its functions of absorption and transit of liquids and gases. This will apply not only to the external surface, but also to those internal surfaces which limit one tissue tract from another. Upon the basis of this premise, he concludes that in the ontogeny and phylogeny of ferns the form of the vascular tissues is largely dependent upon the size of the plant and of its various organs. Thus, as the fern plant and its foliar appendages become larger, the simple and presumably primitive protostele tends to become involuted, medullated (solenostely), or dissected into separate strands (polycycly, perforation, dictyostely).

BOWER's correlations between size, form, and function are very suggestive, and deserve careful consideration, particularly by students of the phylogeny of the vascular cryptogams. It must be admitted, however, that there is a considerable element of uncertainty in interpreting such correlations. The fact that complex structures tend to occur in large plants does not prove necessarily that size is the primary factor in their evolution, although such a conclusion appears to be extremely plausible.—I. W. BAILEY.

Deccan vegetation.—The ecological problems of many portions of India are complicated by the density of the population and the intensity of the grazing. The rainfall of 27 inches in the Deccan coming during the months from June to October, preceded by a very hot and dry period, causes the erosion of fields denuded of vegetation by drought and grazing. In such a region the study of natural vegetation in areas protected from cattle has been begun by BURNS and CHAKRADEV[11] as a preliminary to work on the improvement of grazing lands. Permanent quadrats were established within barbed wire inclosures. Native grasses such as *Andropogon monticola* and *Iseilema laxum* appear to be able to establish themselves completely, and it seems

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[10] BOWER, F. O., Size, a neglected factor in stelar morphology. Proc. Roy. Soc. Edinburgh **41**:1–25. 1921.

[11] BURNS, W., and CHAKRADEV, G. M., An ecological study of Deccan grassland. Jour. Indian Bot. **2**:84–91. 1921.

possible that a more mesophytic grassland may be the climax, with the formation of a turf resisting erosion.

Investigations by BHIDE[12] during one of the worst droughts on record, in 1918–19, have taken into account some of the plants showing the most successful resistance to such arid conditions. Such data not only add to our knowledge of the existing vegetation, but furnish material for improving existing economic conditions in a region where grazing is of first importance.

The anatomy of many plants of the arid region is also being investigated by SABNIS.[13] The results of such efforts are certain to be valuable for India and interesting to botanists elsewhere.—G. D. FULLER.

Tension zone between forest and prairie.—Following an earlier study by WEAVER and THIEL, an interesting tension zone investigation has been carried on by POOL, WEAVER, and JEAN[14] in eastern Nebraska. Stations were selected at Peru, near the Missouri River, and at Lincoln, sixty miles west of Peru. By means of quantitative experimental study, striking contrasts between these two stations, due to both climatic and edaphic factors, were brought to light. The prairies and woodlands near Lincoln are much more xerophytic than those near Peru, in spite of the short distances involved between the two places. Available soil moisture during the summer of 1917 was exhausted on eighteen different days on a Lincoln prairie and on only four different days on a comparable Peru prairie. Many mesophytic woodland species pass out in traversing the area between these two places. The high saturation deficit and the low soil moisture content of the prairie sites in eastern Nebraska constitute barriers over which forest trees can scarcely pass. The authors feel that herein is the most ready explanation for the confinement of Nebraska woodlands to the moist slopes of narrow valleys and for the general treelessness of prairies. In the order of increasing mesophytism, the forests about Peru are as follows: bur oak-yellow oak, black oak-hickory, red oak, linden-ironwood, while the common forest type about Lincoln is that of the bur oak-hickory.—H. C. COWLES.

Composition of plants as affected by nutritive elements.—Growing the oat plant in analyzed quartz sand, DICKSON[15] has made a study of the effects of a deficiency of certain nutrient elements on the calcium and phosphorus

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[12] BHIDE, R. K., Drought resisting plants in the Deccan. Jour. Indian Bot. **2**: 27–43. 1921.

[13] SABNIS, T. S., The physiological anatomy of the plants of the Indian desert. Jour. Indian Bot. **2**:1–19, 61–79, 93–115. 1921.

[14] POOL, R. J., WEAVER, J. E., and JEAN, F. C., Further studies in the ecotone between prairie and woodland. Univ. Nebraska Studies **18**:1–47. *figs. 17.* 1918.

[15] DICKSON, J. G., The relation of certain nutritive elements to the composition of the oat plant. Amer. Jour. Bot. **8**:256–274. *figs. 2.* 1921.